

Notes on literature.

Microbiology + Chemistry
Genetics

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Coleurd, R. CRAS 216 : 616, 1943 Acteas des rayons X
sur la fréquence d'une mutation bactérienne.

S⁻ to S⁺

Spont. 5×10^{-8}

$\bar{z} = 5$ min. (~~ps = 1~~) $(75000 n!!!)$ 60×10^{-8}

Cooper KE & D Woodman, JPB 58:75-84 (1946) The diffusion of antiseptics
through gauze... Dept Phys Med
Un. Bristol

$$m' = m_0 e^{(-\frac{x^2}{4Dt})} \quad x = \text{distance}$$

$$\underline{\text{conc}}(x) = m'$$

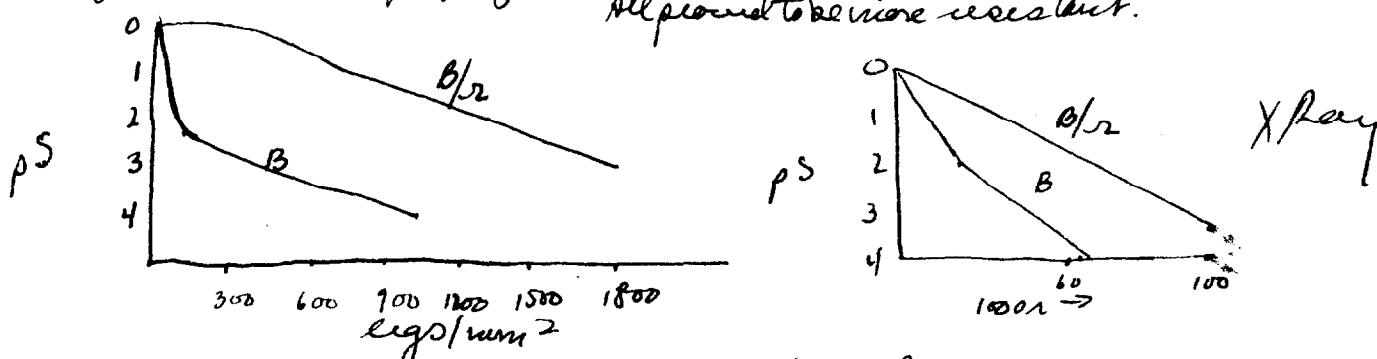
D = const.

$$\frac{dc}{dt} = D \frac{\partial^2 c}{\partial x^2}$$

Witham, E.M., PNAS 32(3): 59-68 (1946) Selected differences in sensitivity to radiation in Escherichia coli.

u.v. - GE Hg lamps 2537 Å. Irradiated on petri plates. Colony counts at 24 hours.

$B, 5 \times 10^7$, irradiated ≈ 1000 eggs/mm². At 24 h. (nutrient agar) 4 colonies developed. One was propagated as B/r and proved to have a different resistance. All proved to be more resistant.



No other levels of resistance were found.

B/r is also X-ray resistant

At $pS = 2$, there are breaks in the killing curves of B by partially辐照. by B/r .

Iod B/r in broth is less, m.g.t. 19 mins. At 50 eggs, pS of B is 1; of B/r is 0. However, after 3 hours, the cells of B are elongated and undivided, of $B/r \rightarrow 100$ cells.

A second irradiation of 700 eggs will reduce each B/r microcolony leaving a representative but kill each undivided long cell of B . The effectiveness of the technique in mixtures of B and B/r indicate that the long cells behave like individual bacteria in respect to radiation. With large samples, surviving colonies are tested for resistance by a test dose + clagation phenomena. Delbrück analyses. Induced mutations are not detected. $B \rightarrow B/r \quad 10^{-5}$ / generation.

The curve for B/r is a multiplikat curve.

Lindgren, C.C., PNAS, 32: 68-70 (1946) A new gene theory and an explanation
of the phenomenon of dominance to ~~the cytoplasm~~. Mendelian segregation of the cytoplasm

chromogone = place of attachment for cytochrome.

contaminated recessive = chromogone - cytochrome⁺

Assorters of cytoplasmas contain recessive loci.

$$F \times + \rightarrow \begin{matrix} F \\ f \\ f^{\text{cont.}} \end{matrix}$$

$f \times f^{\text{cont.}} \rightarrow 1:1$ in most cases.

Hooray!

Ferguson, T.B. + S.O. Thorne, Jr., J Pharm 86: 208-63 (1946) The effect
of some dioxine compounds on the growth & respiration of E. coli.
Dulce.

ATCC 6522 SG.

Dioxines:

1. 3-amino
- 1a 5-amino, 1,2,3,4-tetrahydro
- 2 2-dimethyl-7-amino
3. 5-amino
- 4 2,7-diamino
- 5 2,8-diamino.

Riboflavin had no effect.

Effect on oxidation of various substrates (glycose, pyr, lactic, aspar, oleic) is in different order (1, 4, 2, 5, 3) from growth (1...5)
% inhibition increases w pH.

Cope, S. + D. Cameron, J CCP 27:43-52 (1946) Effect of a respiratory enzyme system + creatine upon the growth of cells in vitro

dephorase (~~FAD~~) (FAD)

At 10^{-6} ~~conc.~~ elicited response in tissue culture

dose. creatine 50 mg %. only when unfertilized.

together, synergy.

Heskey, A.O. J. Bact. 38: 563-78 (1939) Factors limiting bacterial growth.
III. Respiration & growth properties of *coli* surviving sublethal temperatures

Waddell, Agnes H., Edinburgh Math. Notes, #35 Dec. 1945 Curves formed by colonies of microorganisms growing on a plane surface.

Mathematical analysis of outlines of conjoined colonies of bacteria.

Wenlow - E-A, G.R.B. 9:259-74 (1938)

Falla, Is. The role of certain cations bacterial physiology. *Americ. Abst.*
Bact. 7: 33, 87, 133 (1923).

X

distilled water as good as NaCl for *E. coli*.

Whistler + OA Brook. J. Bact. 13: 235-43 (1927) The virility of various spp. of bacteria in aqueous suspensions.

Giant growth suspended in H₂O & incubated 18-20 hours at 37°.

E. coli highly resistant even when carefully washed. (high concn 10⁶)

10⁻³ both protects B. cereus from ~~toxic~~ death in saline.

N. rapid effects (1-2 h.).

• 0.145 M NaCl best menstruum for virility -

7.725 is toxic. Only 5-10% killed in H₂O in 9 h.
20-40 x 10⁶ conc.

, 85% = 8.5 g/l = ca. 2 N.]

Sheeran, J. M. + H. B. Naylor, Aging & reproduction and the viability of young bacterial cells at low temperatures. J. Bact. 43:749 (1942)

Effects of certain mild agents (cold, low saline etc. are) greater on "young cells". During lag, bacteria become sensitive just before active reproduction.

A 4-hour *E. coli* culture at 37° grad. cooled to 1° C. (15 min.) Samples were warmed gradually & suddenly killed. As a control, a 24 hr. culture over a period of 3 hours. in 1% peptone was semi-treated.

The "young" cultures were held at 1° for periods up to 36 days & suspended to cold shorts by being killed & ⁱⁿ lag in continuing growth at 37°. *S. faecis* cells did age.

When held at 1° "young cells" die more rapidly.

Days held.	<u>Y.</u> $\times 10^2$	Viable cells/ml.	Mature.
0	8.6		
2	1.47	650	
4	.49	460	
7	.125	440	
14	.004	192	
21	400	95	
36	72	43	
42	-	39	
51	-	16	
62	-	10	

Nelson, F. E. J. Bact. 48:473-7 (1944) Factors which influence
the growth of heat treated ~~cold~~ bacteria.

Basal - NH_4 , KPO_4 , glucose agar + peptone - Tryptone used most.

Heat E. coli 55° 8 min.

Medium.	Counts (troph.) $\times 10^3$
Minimal	.46, .32
.01% tryptone	.74, .39
.04%	1.0, .89
.2%	3.0, 4.6
.5%	6.5, 16.0
+ .01% thymol	14.0, 25.0
+ .01% tryptone better	

Untreated organisms were essentially same in all plates.

I.

45.395-403 (1943)

Iowa State College
Ames, Iowa.

Temperature

Cowan, H.R. + F.R. Evans, J. Bact. 34: 179 - 1937

The importance of enrichments in the cultivation of bacterial spores previously exposed to lethal agents.

B. subtilis, *cohaerens*, + *albolactis* - ATCC
"CC". *E. coli*

"Nutrient agar" gave much lower plate counts when treated cultures were tested than were obtained in supplemented media, e.g.

"1 drop of st. defibrinated cow's blood per plate"

.3cc 10% glucose.

These supplements had no effect on untreated cultures.

Temp - 98° how long?
 H_2O_2 .05%
Details not stated

Spores generated on the WA but later did not respond to supplement.

Y.E. deleterious, if anything.

E. coli. 18 hours b.c. culture.

N.A.	Treated	U-V	A.
"	57	20	27
" + blood	57	65	102
" + glucose	60	45	105
" yeast	61	25	27
Muscaria agar	61	38	189
Panadero agar + milk pdl.	54	69	237

This can be investigated.

Hansen, P.A. Arch. f. Mikrobiol. 5:99-122 (1933) The growth of
thermophilic bacteria.

Temperature - tolerance

Williams, F. T. J Bact 32: 589-97 (1936)

Attempts to increase the heat resistance of bacterial spores.

Various strains. Peptone - yeast extract - sugar

Temperature-tolerance by heat.

Edwards, OF + LF Kettler, J. Bact. 34: 489 - 1937

The relation of certain respiratory enzymes to the maximum growth temperatures of bacteria.

M.G.T. measured by observation in liquid + solid tubes in a variety of organisms. Solid or liquid had no effect.

A statistical correlation was found, among different strains, between temperature of destruction of enzyme activity (cytochrome oxidase, catalase and succinic dehydrogenase).

E.g.: °C.	M.G.T.	Cytochrome Oxidase	Catalase	Succ. dehy.
B. mycoides	40	41	41	40
"Thermophiles"	76 ¹⁸	65	67	59
	1	2	3	4

A correlation of .8466 = R_{1,234} was found for these strains.

"Indophenol" oxidase activity gave best correlations.

$$r_{12} = .8431 \quad r_{13} = .8451 \quad r_{14} = .7737$$

Qualitative tests: on intact cells

(2) - CN sensitive, indirect p-phenylenediamine oxidation

(3) H₂O₂

(4) Thimberg. Methyl Blue.

Endorsements quashed.

Dunn, M.S., et al., JBC 156:703 - 713 (1944)

XVII. The amino acid requirements of *Leucostoma mesenteroides*.

Standard curves formed for arg, cyst, glut, hist, asp, leuc, lys, meth,
& A, pro, trypt, tyr + val.

Cleavine, Hoprol, norl, & nov, were non-essential or auxotrophic.

In medium "c", ϕ Al. was required, 150 r/tube giving max ex. prod.

XIX The determination of lysine in protein hydrolysates by a microbiological method.

Korhonen, S., H. Quinn + L. B. Rubin, JBC 151:511- (1943)

The microbiological analyses of 7 amino acids in *L. casei*.

72-hour ex. cultivation.

ØA. required: 30r / tube for $\frac{1}{2}$ max. growth.

Medium of Hestings + Peterson PSEG M 52: 26 1943.

50 mg in

HISTIDINE; ASSAY

Rumm, M.S., et al. JBC 159: 653

Histidine by Leucosteric

TRYPTOPHANE

L.arabinosus

Wright, L.P. and Shuggs, H.R. JBC 159: 611- 1945

Substrate utilization
and synthesis.

Tryptophane utilization and synthesis by strains of L.arabinosus

RYRIDOXINE + CO₂

Amino Acid Assay.

Jernan, C.M. et al JBC 162: 173-4 (1946) on the function of
pyridoxine in lactococcus. bacterium. letter.

Amino ac. requirements modified by CO₂.

CO₂ + pyridoxine removes requirement for ϕ A, Tyr, Arg in L. casei
^(16r) and Aspartic in S. faecalis

Texas.

THREONINE assay

S. FECALIS amino acid analysis

Greenhut, I. T., BS Scherzer & CA Elvekjem,

JBC 162: 69 - 76

The amino acid requirements of *S. faecalis* and the use of this organism for the determination of thr in natural products.

Leuc, thr, gl, asp, lys, val, isol, meth, arg, hist, ser, trypt, and cyst required.

Alan, tyr, DA, glyc stimulatory.

Differ \pm Snell and Seznec who did not require meth, val, hist and isol, and that alan was

Purines, biotin, pnt, B_2 , B_6 , niacin, + folic
Glucose, citrate, Mg, Fe, Na, Mn

Response to dl is not linear. Unnatural isomers (~~all~~ ll+) inactive

2 - 5 hour hydrolysis \pm 2 NHCl, autocl. gave satisf. recovery

ATC 8043

Wisc.

Aherns, P & J L Ward, BJEP, 26:120 - 1945 The antibacterial
effects of analogues of vitamin K.